of 1909–10; at Naples there are almost 7,000 students, and at Tokyo over 5,500.

It will probably be some time before Columbia University—in point of student enrollment the largest American university—or any other American university attains to the distinction of attracting the largest student body in the world to its halls; and in the meantime it is well to bear in mind that, after all, greatness and not bigness is the most important factor in the development of our higher institutions of learning, and that the Columbia authorities lose no opportunity to emphasize the value of quality in contradistinction to quantity.

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SCIENTIFIC BOOKS

The Doctrine of Evolution: its Basis and its Scope. By HENRY EDWARD CRAMPTON, Ph.D., Professor of Zoology, Columbia University. New York, Columbia University Press. 1911. 12mo, pp. ix + 311. $1.50 net.

The difficulties of presenting scientific conceptions and results in wholly untechnical language are abundantly evidenced; they are appreciated by every one, most keenly by those who have attempted the task. Failure to achieve such a purpose seems to follow more often from falling away from the strictly scientific method and spirit, than from an inability to make facts passably intelligible.

To Professor Crampton, however, must be granted a large, if not a complete, measure of success in his attempt thus to set forth the essentials of the evolution idea. For the lucidity of his untechnical statements of facts makes his work thoroughly intelligible, while his method and the scientific spirit which pervades the work make it convincing.

This volume consists of the Columbia University Hewitt Lectures for 1907. As such they were prepared for an audience "of mature persons of cultivated minds, . . . quite unfamiliar with the technical facts of natural history." All consideration of the work must obviously be made with the nature of its adaptedness constantly in mind: it is intended as "a simple message to the unscientific."

The introductory chapter provides a setting for the evolution doctrine and includes a brief discussion of certain fundamental principles of science in general, and in particular of biology. There are the necessary descriptions of the biological sciences, of the nature of the organism, and of life processes, throughout which the wisdom of the author is evidenced by his discreet avoidance of the word "vitalism" in any of its present meanings. The second and third chapters are given to setting forth the evidences of evolution as afforded by the structure, the development, the fossil history and the geographical distribution of organisms. Factors in the process of evolution are reviewed in the fourth chapter. This concludes what might have been termed Part I. of the work, dealing with general evolution.

In the remaining chapters the author takes up various phases of human evolution for especial emphasis and more detailed treatment. Presentation of the facts regarding the "physical" evolution of the human species is followed by an account of the evidences for the evolution of the human races. This leads to an account of man's mental evolution, which is discussed from the standpoints of comparative psychology, both descriptive and genetic, of "comparative anthropology," and of the "paleontology of mind."

It is at this corresponding point that many somewhat similar accounts of evolution terminate. Professor Crampton, however, does not fail to discuss those aspects of the evolutionary doctrine which the general reader to-day regards as of the most importance, and concerning which there is the greatest need for simple, sane, scientific treatment. For there follow two chapters entitled "Social Evolution as a Biological Process" and "Evolution and the Higher Human Life." Many will find these the most valuable parts of the book, for here are reviewed, in simple terms, the fundamental evolutionary aspects of social relations, and of ethics, religion and philosophy.

In its general plan this work is not unlike

the valuable series of Romanes. Throughout it is conservative, perhaps ultra-conservative in its treatment of such topics as the biogenetic law, the heritability of modifications, and some other general subjects. And it is thoroughly orthodox; the giraffe and the blacksmith are not found wanting.

The entire American Museum of Natural History would be required adequately to illustrate so inclusive a theme as this. And the complete absence of figures, which were abundantly provided for the lectures themselves, is a serious defect. The capacity, even of the careful reader, for misunderstanding language, is enormous. Even a few well-selected figures would give the reader a frequent sense of definite concreteness which is occasionally lacking in some of the passages dealing with the facts of evolution.

There is no index.

It is safe to say that this book will prove immensely useful, and its use will not be limited to the unscientific. Students of biology and sociology will find it a valuable aid and summary. In marked and agreeable contrast to Romanes's work, it is entirely free from controversial tone, and its excellent spirit, so well evidenced by the concluding chapters, will go far toward making the doctrine of evolution completely acceptable to those who still persist in exempting from evolutionary treatment and understanding, certain large and important fields of human action and thought.

W. E. KELLICOTT

Guayule, a Rubber Plant of the Chihuahuan Desert. By F. E. LLOYD. Carnegie Institution of Washington, Publication No. 139. 1911. Pp. viii + 213. Plates 46, text figures 20.

It is seldom that the results of a critical study of one plant from several different viewpoints are brought together at one time within the covers of a single book. The author of Guayule has, however, collected many facts relating to the growth and utilization of *Parthenium argentatum* Gray, which are worthy of notice. The interest in the present work from the scientific standpoint is enhanced by the fact that the subject of the investigations is a native of desert regions relatively little known botanically or ecologically. From the economic standpoint it is of interest as furnishing a record of a plant of peculiar importance commercially, whose life history and habits were hitherto practically unknown, though subjects of abundant speculation and conjecture.

The first chapter presents a brief historical account of the Guayule and its use. The writer traces the development of the industry and describes some of the methods of extraction, which in this case are based upon the fact that the rubber is not produced in latex which issues from incisions in the bark, but is obtained only upon trituration of the stem, branches and roots of the plant. Involving, as it does, the immediate destruction of the whole plant, the manufacture of Guayule rubber is attended by the prospect of an early depletion of the natural supply. Hence investigations were begun looking to the placing of the enterprise upon a permanent footing.

The environment of Guayule and its biotic relations are discussed in the second chapter. *Parthenium argentatum* is distributed widely over the Mexican plateau and on hills whose soil is chiefly of limestone origin. Its altitudinal distribution is from 2,000 to 10,000 feet, though mostly from 5,000 to 6,000. The local distribution of the plants and the extent of their numerical development were carefully studied by the author, who is unable, however, to explain the almost total absence of Guayule in the alluvial soil of the broad playas. He suggests that this fact may be due to the meager aeration of the soil of the playa, and to the possibility of a slight acidity, owing to the presence of a slight quantity of humus. The reviewer has obtained results[1] that seem to show that the mechanical conditions of a fine alluvial soil are not unfavorable to the growth of Guayule. But on the other hand it should be noted that the quantity of water-soluble salts is less in

[1] *American Review of Tropical Agriculture*, May–June, 1910.